

Report Prepared for the
Horticultural Development Council

FV 274
Cutworm development and survival:
a risk assessment and early
warning programme for growers.

Final Report

By

M.J.Lole
ADAS
September 2005

Authentication

I declare that this work was done under my supervision according to the procedures described herein and that the report represents a true and accurate record of the results obtained.

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Signature..... Date.....

Authorisation

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Project Number: **Cutworm development and survival: a risk assessment and early warning system for growers**

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Grower Summary

Headline

Cutworm development was monitored for the 10 weeks of the 2005 season. Assessments of the risk of damage were made on a weekly basis and spray warnings were issued as appropriate

Background

Cutworms are the caterpillars of certain moths, especially turnip moth. The mature caterpillars feed underground and are safe from insecticides, but the young larvae feed on the foliage of host crops where they are vulnerable to heavy rainfall as well as pesticides. By computing the rate of development of cutworms and integrating this with rainfall records it is possible to predict where and when the threat of cutworm damage has become sufficient to justify a pesticide treatment. In some years there is sufficient rain to keep the risk of cutworm damage at low levels without any treatment.

Results and Conclusions

11 cutworm reports were prepared between 2nd June and 4th August 2005 and were made available to HDC members on the Warwick HRI website. See appendices for copies.

Overall, 2005 did not prove to be a high-risk year as far as cutworm damage is concerned. The areas of Britain at highest risk were central southern and south-eastern England (see map 2), particularly Hampshire and Sussex. Treatment of the most susceptible crops was recommended in these areas on about the 21st of July, but even in the highest-risk parts the cutworm survival index did not rise high enough to justify treatment of potatoes.

Action Points for Growers

- During the 'cutworm season', between June and August, the cutworm forecasts should be consulted on a regular basis.
- Crops should only be treated against cutworm when the predicted risk of damage reaches the trigger level. In most years this will save the expense and potential environmental effects of routinely-applied treatments.

Expected Practical and Financial Benefits

- Minimisation of unnecessary treatment against cutworms saves both costs and possible environmental effects

Science Section

Background

- Cutworms are the larvae (caterpillars) of certain moths of the genus *Agrotis*, particularly *Agrotis segetum*, the turnip moth.
- Later-instar caterpillars feed underground and can cause severe economic damage to a wide range of crops by either severing them or excavating holes in roots.
- Susceptible crops include lettuce, leek, red beet, onion, carrot, leaf and flowerhead brassicas, swede, turnip, sugar beet, potato, strawberry and some ornamentals.
- Cutworm development rate and survival are influenced by temperature and rainfall respectively. The potential for damage is much greater in warm, dry summers than it is in cool, wet ones as the survival of young cutworms is significantly reduced by rainfall.
- Early instar cutworms (which feed above ground) can be controlled by the use of pesticides or irrigation if there is a significant risk of damage. The timing of treatment is critical and must be made between egg-hatch and the time when cutworms enter the soil half way through their development.
- The established ADAS cutworm forecasting system has been in operation for many years and uses meteorological and cutworm development data to predict the risk of cutworm damage in British crops.
- Using a forecasting system enables growers to treat crops when the risk of damage is high and to leave them unsprayed when the risk is low. This saves unnecessary use of pesticides and allows growers to comply with crop production protocols.

Summary

Individual weekly reports can be summarised as follows:

- 2nd June. First turnip moths caught at the end of May. First hatch predicted for the second week of June
- 9th June. Turnip moths now caught in all areas. First hatch was on 11th June in the earliest area (Cambs)
- 16th June. Further cutworm hatch occurring or about to occur. Development proceeding rapidly in warm temperatures.
- 23rd June. Cutworms approaching third instar in earliest areas. Will be getting there by the end of the month in most areas. Rainfall expected.
- 27th June. Rainfall in Wales, and England south of a line Mersey-Wash, except for E Anglia, the south-east and Cornwall. These dry areas now at some risk of cutworm damage. Spray warning issued for these areas if there is no rain before the end of June.

- 30th June. Some localised rain. Immediate spray warning issued for the most susceptible crops in Kent, Sussex and parts of Hants, which remained dry.
- 7th July. Widespread rainfall. All spray warnings withdrawn.
- 14th July. Warm, dry weather encouraging further cutworm development. Cutworm risk increasing in Hants, Sussex and Berks.
- 21st July. Warning issued to spray the most vulnerable crops in Central S England and the Severn/Wye areas.
- 28th July. Heavy rain fell on 23-27th July, in time to negate spray warnings.
- 4th August. Further heavy rain sees the end to any cutworm risk for this season.

Note that the Appendices comprise copies of all weekly reports.

Horticultural Development Council
Cutworm Monitoring & Prediction, 2005.

Prepared by Mike Lole
ADAS Wolverhampton

Report No 1, 2nd June 2005

Background

Cutworm

“Cutworm” is the name given to caterpillars of certain Noctuid moths, in particular those of the turnip moth *Agrotis segetum*. The name derives from the habit of the older caterpillars of feeding underground, damaging plant roots and stems (including the storage organs that we use for food), sometimes so badly that the plant topples.

The adult moths lay eggs on plants or on pieces of litter and debris in the soil, usually from the end of May or early June. These hatch in around 8-24 days, depending on temperature. The young caterpillars seek out and feed on the aerial parts of plants. In a further 10-20 days, again depending on temperature, the caterpillars go through their second moult, becoming “third instar” caterpillars. It is at this point that they adopt the cutworm habit, becoming subterranean and feeding on roots etc.

Unhatched cutworm eggs and the older, subterranean caterpillars are largely invulnerable to the effects of the weather and insecticides. The two early caterpillar instars differ, however. If there is substantial rainfall (defined as 10mm or more of rain falling in showers of moderate intensity over a 24-hour period) whilst these caterpillars are feeding above ground then this causes high mortality among them. They are also vulnerable to insecticides whilst feeding on the foliage.

Crop Susceptibility

Crops differ in their susceptibility to cutworm damage. The most vulnerable are lettuce, leek and red beet. Young lettuce and leek plants are easily bitten through by cutworms, and though beet plants may survive an attack the bulbous root is rendered unmarketable by cutworm feeding. Moderately susceptible crops include brassicas, carrot, celery, parsnip and sugar beet. The least susceptible of those vulnerable to damage are onion, potato, swede and turnip.

The Cutworm Model

The cutworm model is a computer programme that uses weather data to predict the rate of development of turnip moth eggs and caterpillars. It also predicts the level of rain-induced mortality among the early-instar caterpillars. The weather data used cover 600 sites in the whole of Great Britain, so that local differences in weather can be reflected in the forecasts of development that are used in the model.

Rate of development and the level of rain-induced mortality must both be known if a rational choice is to be made about the need for insecticide treatment of vulnerable crops. The cutworm model is therefore an important tool for the grower.

Moth Activity

The activity of adult moths is monitored by ADAS, Warwick HRI and STC in order to provide information on when oviposition may be taking place. In 2005, traps are being run in Lincolnshire, Cambridgeshire, Hampshire, Shropshire, Yorkshire and Warwickshire.

Current Situation

To date turnip moths have been caught in Cambridgeshire, (w/e 27/05/05), Warwickshire (w/e 31/05/05) and Yorkshire (w/e 31/05/05). On past form, moths are likely to be caught in the remaining traps in the next 7 days.

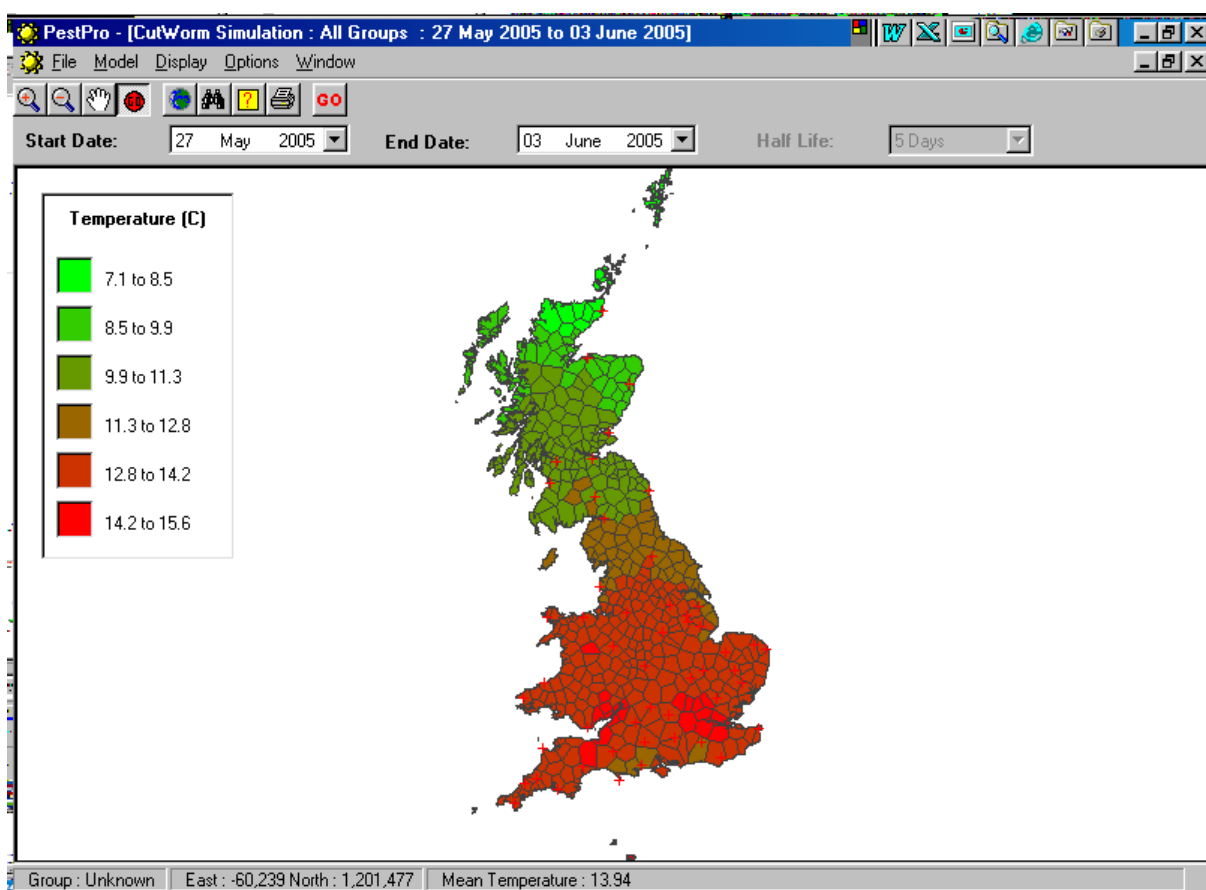
Assuming that the Cambs moths began laying eggs on the day the first one was trapped, the earliest-laid eggs have by now completed over half their development and, given similar temperatures to those applying currently, will begin to hatch in about 10 days. Temperatures are currently highest around the Thames and Severn estuaries (see map below) so this is where the earliest hatches may occur.

Temperature and rainfall after hatching are important as these dictate both the speed of development of the larvae and the mortality of the young instars.

Action

No action will be necessary for at least a fortnight. We will however produce weekly updates on the cutworm situation from now until August 2005.

Mean daily temperatures, 27th May –2nd June 2005



Horticultural Development Council
Cutworm Monitoring & Prediction, 2005.

Prepared by Mike Lole
ADAS Wolverhampton

Report No 2, 9th June 2005

The 'Background' section is repeated from last week's report, for those who missed it. If you have already seen this go straight to the 'Current Situation' section.

Background

Cutworm

"Cutworm" is the name given to caterpillars of certain Noctuid moths, in particular those of the turnip moth *Agrotis segetum*. The name derives from the habit of the older caterpillars of feeding underground, damaging plant roots and stems (including the storage organs that we use for food), sometimes so badly that the plant topples.

The adult moths lay eggs on plants or on pieces of litter and debris in the soil, usually from the end of May or early June. These hatch in around 8-24 days, depending on temperature. The young caterpillars seek out and feed on the aerial parts of plants. In a further 10-20 days, again depending on temperature, the caterpillars go through their second moult, becoming "third instar" caterpillars. It is at this point that they adopt the cutworm habit, becoming subterranean and feeding on roots etc.

Unhatched cutworm eggs and the older, subterranean caterpillars are largely invulnerable to the effects of the weather and insecticides. The two early caterpillar instars differ, however. If there is substantial rainfall (defined as 10mm or more of rain falling in showers of moderate intensity over a 24-hour period) whilst these caterpillars are feeding above ground then this causes high mortality among them. They are also vulnerable to insecticides whilst feeding on the foliage.

Crop Susceptibility

Crops differ in their susceptibility to cutworm damage. The most vulnerable are lettuce, leek and red beet. Young lettuce and leek plants are easily bitten through by cutworms, and though beet plants may survive an attack the bulbous root is rendered unmarketable by cutworm feeding. Moderately susceptible crops include brassicas, carrot, celery, parsnip and sugar beet. The least susceptible of those vulnerable to damage are onion, potato, swede and turnip.

The Cutworm Model

The cutworm model is a computer programme that uses weather data to predict the rate of development of turnip moth eggs and caterpillars. It also predicts the level of rain-induced mortality among the early-instar caterpillars. The weather data used cover 600 sites in the whole of Great Britain, so that local differences in weather can be reflected in the forecasts of development that are used in the model.

Rate of development and the level of rain-induced mortality must both be known if a rational choice is to be made about the need for insecticide treatment of vulnerable crops. The cutworm model is therefore an important tool for the grower.

Moth Activity

The activity of adult moths is monitored by ADAS, Warwick HRI and STC in order to provide information on when oviposition may be taking place. In 2005, traps are being run in Lincolnshire, Cambridgeshire, Hampshire, Shropshire, Yorkshire and Warwickshire.

Current Situation

Turnip moths are now being caught in nearly all of the monitored sites and it is reasonable to assume that egg-laying is now occurring in all areas. June 2nd is acceptable as the date when turnip moth egg-laying began generally in the UK this year.

In Cambs moths were detected earlier than other areas and, assuming that they began laying eggs on the day the first one was trapped, the earliest-laid eggs (27th May) have by now almost completed their development. These are likely to begin hatching at the weekend (11th June). In most of the rest of the UK, assuming egg-laying began on June 2nd, the first caterpillars will not hatch for a further 9 or 10 days from now (ie about 18th June) as cooler night-time temperatures have slowed development.

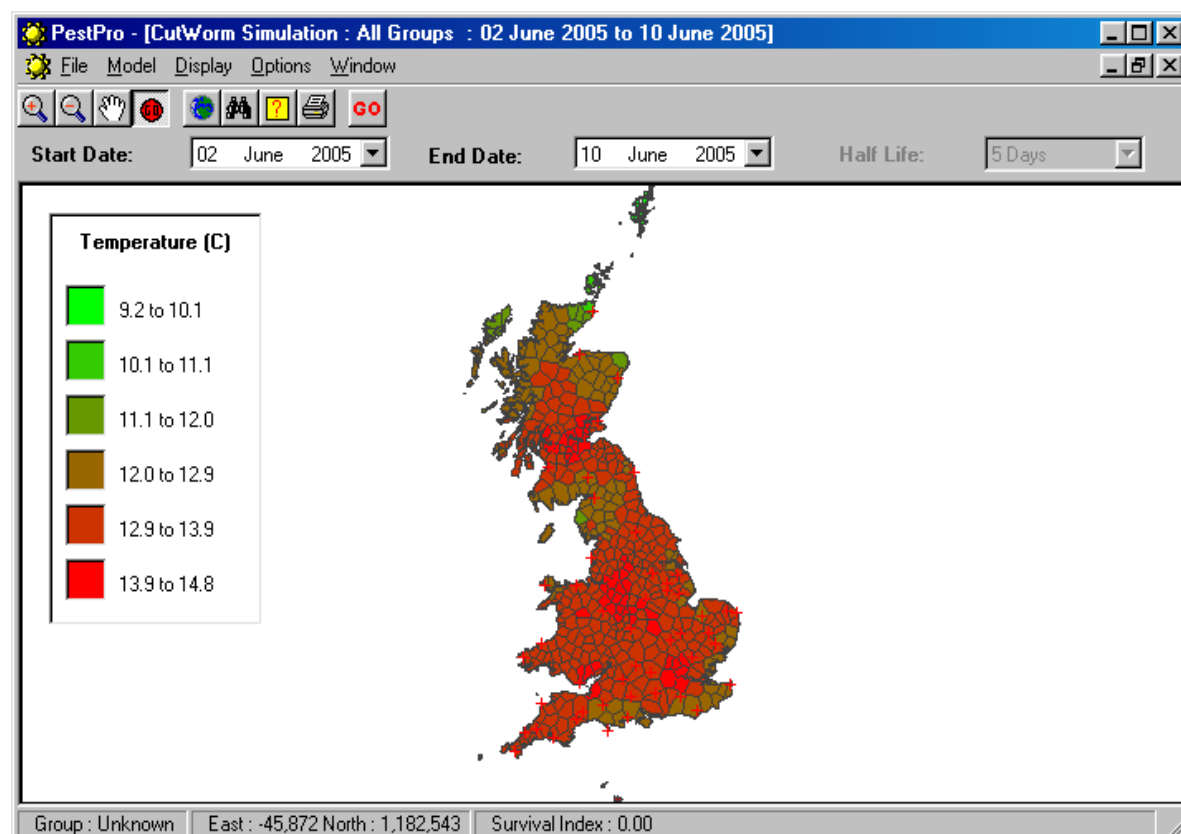
Temperature and rainfall after hatching are important as these dictate both the speed of development of the larvae and the mortality of the young instars. Once hatching has begun in earnest we will be looking for rainfall events to reduce survival of young caterpillars and obviate the need for treatments. As yet, however, rainfall is irrelevant to survival.

Action

No action is necessary this week.

The next update on the cutworm situation will be produced on 16th June, by which time widespread egg hatch could be imminent.

Mean daily temperatures, 2nd June –10th June 2005



Horticultural Development Council
Cutworm Monitoring & Prediction, 2005.

Prepared by Mike Lole
ADAS Wolverhampton

Report No 3, 16th June 2005

Current Situation

This assessment is based on the assumption that turnip moth egg-laying began in Cambs. on 27th of May this year, and that by June 2nd egg-laying began generally in the UK.

The earliest-laid eggs (27th May, Cambs.) have completed their development and began to hatch on the 11th June. In the six days that have passed since then, the young caterpillars will have completed about a third of their development (approx. 32%) and, given similar temperatures, will begin to reach the invulnerable third instar stage by the end of this month. In most of the rest of the UK, assuming egg-laying began on June 2nd, the first caterpillars should be hatching on about the 17th June, or later where temperatures have been cooler (see map below).

The recent rainfall in Cambs. fell after cutworms had begun to hatch, but only amounted to 3 or 4mm and was not therefore sufficient to influence survival greatly. It requires at least 10mm of good steady rain to cause significant mortality in young caterpillars.

In the rest of Britain the rainfall that occurred recently will not have influenced cutworm survival as the eggs had not hatched at the time that it fell. Unhatched eggs are not vulnerable to rain.

Temperature after hatching is important as this dictates the speed of development of the young caterpillars. The warmer spell that is currently being predicted is likely to accelerate the rate of development.

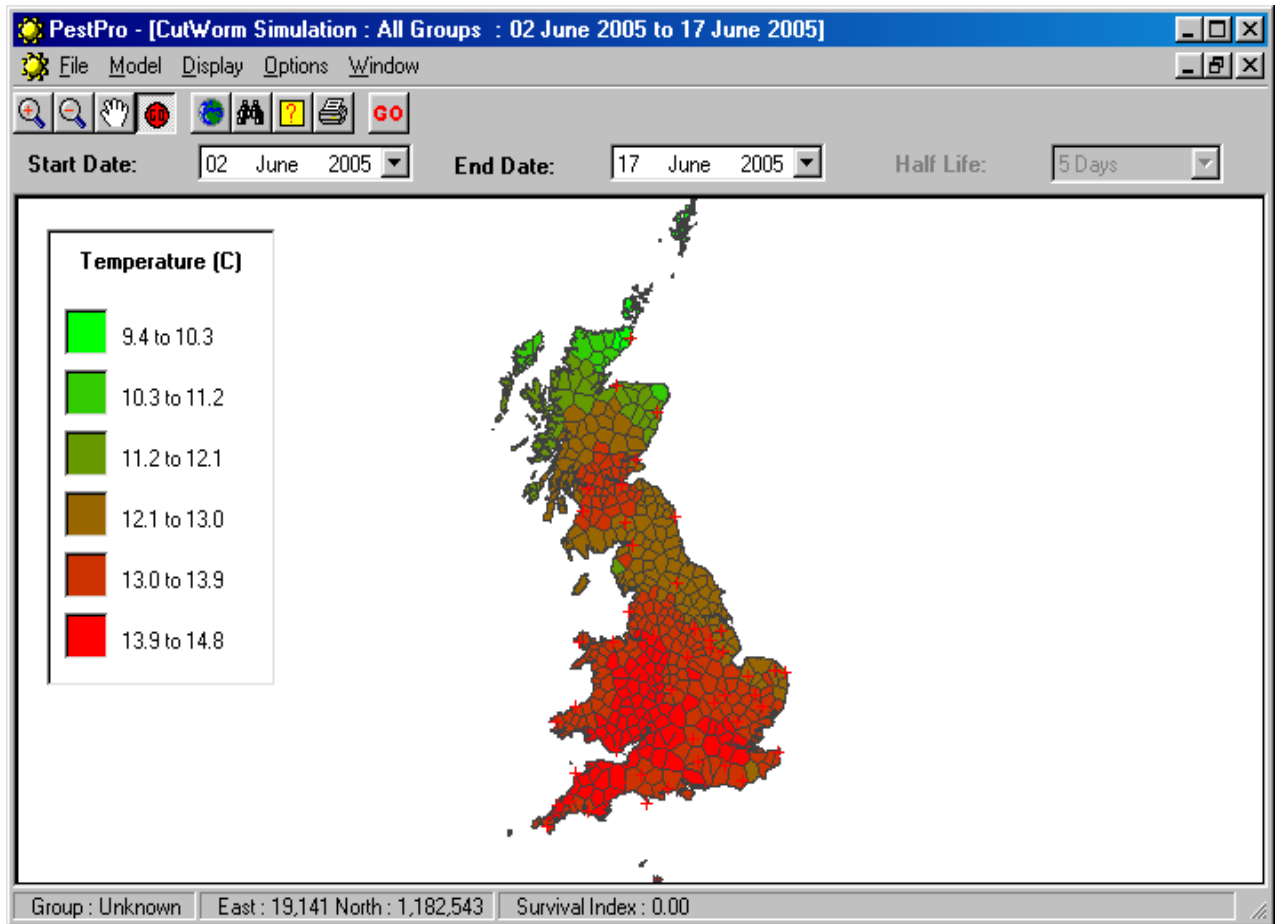
Rainfall affects the mortality of the young instars. Now that hatching has begun rainfall events will be monitored closely as these reduce survival of young caterpillars and obviate the need for treatments.

Action

No treatment action is likely to be necessary for at least 2 weeks. However, growers in all areas should now be monitoring their local rainfall on a daily basis. To give localised coverage this forecast uses data that is to some extent interpolated, and locally-gathered data is likely to be more accurate for specific locations.

The next update on the cutworm situation will be produced on 23rd June, by which time egg hatch will have occurred in most areas and development of caterpillars will be underway. Ensure that you see this forecast.

Mean daily temperatures, 2nd June –17th June 2005



Horticultural Development Council
Cutworm Monitoring & Prediction, 2005.

Prepared by Mike Lole
ADAS Wolverhampton

Report No 4, 23rd June 2005

Current Situation

This assessment is based on the assumption that turnip moth egg-laying began in Cambs. on 27th of May this year, and that by June 2nd egg-laying began generally in the UK.

The earliest-laid eggs (27th May, Cambs.) have completed their development and began to hatch on the 1st - 12th June. The first of these caterpillars will begin to reach the third instar stage by 24th June, at about the same time as eggs laid on the 2nd of June in the warmest parts of Britain (the south-east around London: see map 1). These later-laid eggs began to hatch from the 17th June.

Temperatures have been high since hatch and the young caterpillars have been developing at about 8-9% per day, giving a time of 11 or 12 days from hatch to reaching the third instar stage. This means that for most of Britain third instar larvae will not start to appear before about the 28th June.

It is usual to issue warnings to treat the most vulnerable crops against cutworms when about 5 days-worth of egg-batches have hatched and are about to reach the third instar. This will not be before 27th June in any area and in the majority will not be until the beginning of July.

Rainfall at the critical time between egg-hatch and the third instar, underground-feeding stage can significantly affect the survival of young cutworms. There was heavy rain (causing localised flooding) in a swathe of England stretching from Shropshire and Cheshire in the south-west, through E.Lancs, W. Yorks and N Yorks to the N.Yorks/Durham coast (see map 2) on the 19th of June. This was probably too early to greatly affect survival as most eggs in these areas had yet to hatch at the time. However, there is further rain expected throughout the British Isles on Friday and Saturday this week and this could have much greater significance.

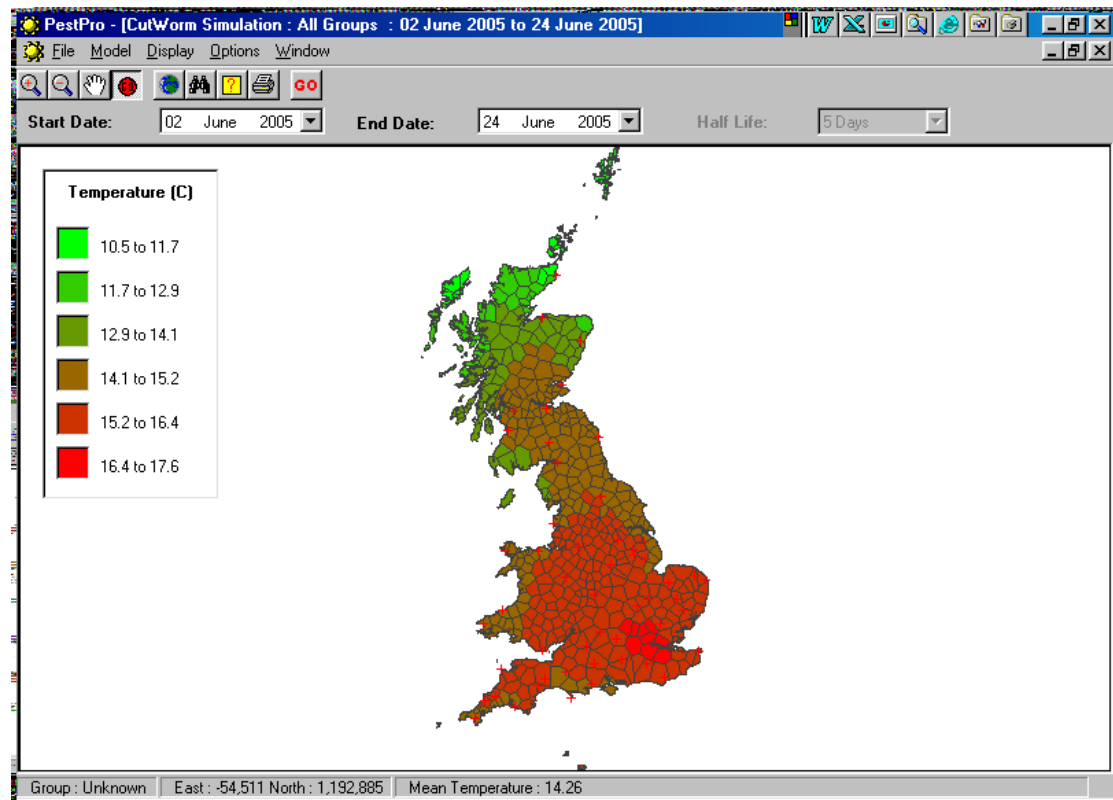
Action

No treatment action is likely to be necessary in any area until 28th June at the earliest, and in the majority of Britain none will be necessary until the 1st of July or later. If there is significant rainfall the need for treatment will be postponed.

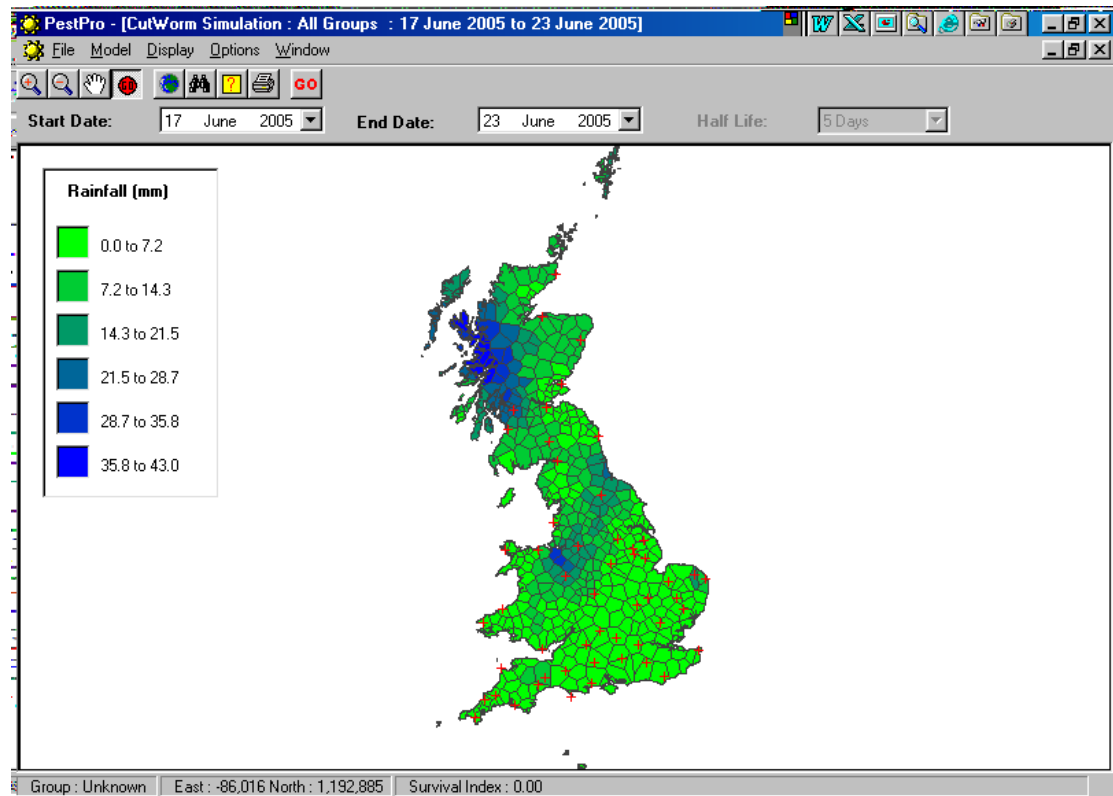
Growers in all areas should now be monitoring their local rainfall on a daily basis. To give localised coverage this forecast uses data that is to some extent interpolated, and locally-gathered data is likely to be more accurate for specific locations.

A further assessment of the situation will be made on 27th June, when the effect of any rain in the meantime can be taken into account. A further update will be produced at this time. Ensure that you see this forecast.

Map 1 Mean daily temperatures, 2nd June –24th June 2005



Map 2 Rainfall, 17th – 23rd June



Horticultural Development Council
Cutworm Monitoring & Prediction, 2005.

Prepared by Mike Lole
ADAS Wolverhampton

Report No 5, 27th June 2005 – Interim Update

Current Situation

This assessment is based on the assumption that turnip moth egg-laying began in Cambs. on 27th of May this year, and that by June 2nd egg-laying began generally in the UK.

The earliest-laid eggs (27th May, Cambs.) have completed their development and began to hatch on the 1st - 12th June. The first of these caterpillars began to reach the third instar stage by 24th June, at about the same time as eggs laid on the 2nd of June in the warmest parts of Britain (the south-east around London). These later-laid eggs began to hatch from the 17th June.

Temperatures have been high since hatch and the young caterpillars have been developing at about 8-9% per day, giving a time of 11 or 12 days from hatch to reaching the third instar stage. This means that for most of Britain third instar larvae will not start to appear before about the 28th June.

It is usual to issue warnings to treat the most vulnerable crops against cutworms when about 5 days-worth of egg-batches have hatched and are about to reach the third instar. This will not be before 27th June in any area and in the majority will not be until the beginning of July.

Rainfall at the critical time between egg-hatch and the third instar, underground-feeding stage can significantly affect the survival of young cutworms. There was heavy rain (causing localised flooding) in a swathe of England stretching from Shropshire and Cheshire in the south-west, through E.Lancs, W. Yorks and N Yorks to the N.Yorks/Durham coast (see map 2) on the 19th of June. This was probably too early to greatly affect survival as most eggs in these areas had yet to hatch at the time. However, heavy rain fell in Wales and in England south of a line between the Mersey and the Wash, excepting East Anglia, the South-East and Cornwall, (see map 1) on Friday or Saturday, which will have had a strong influence on cutworm survival in those areas.

Areas of Southern England that did not get the weekend's rainfall are now at risk of cutworm damage.

Action

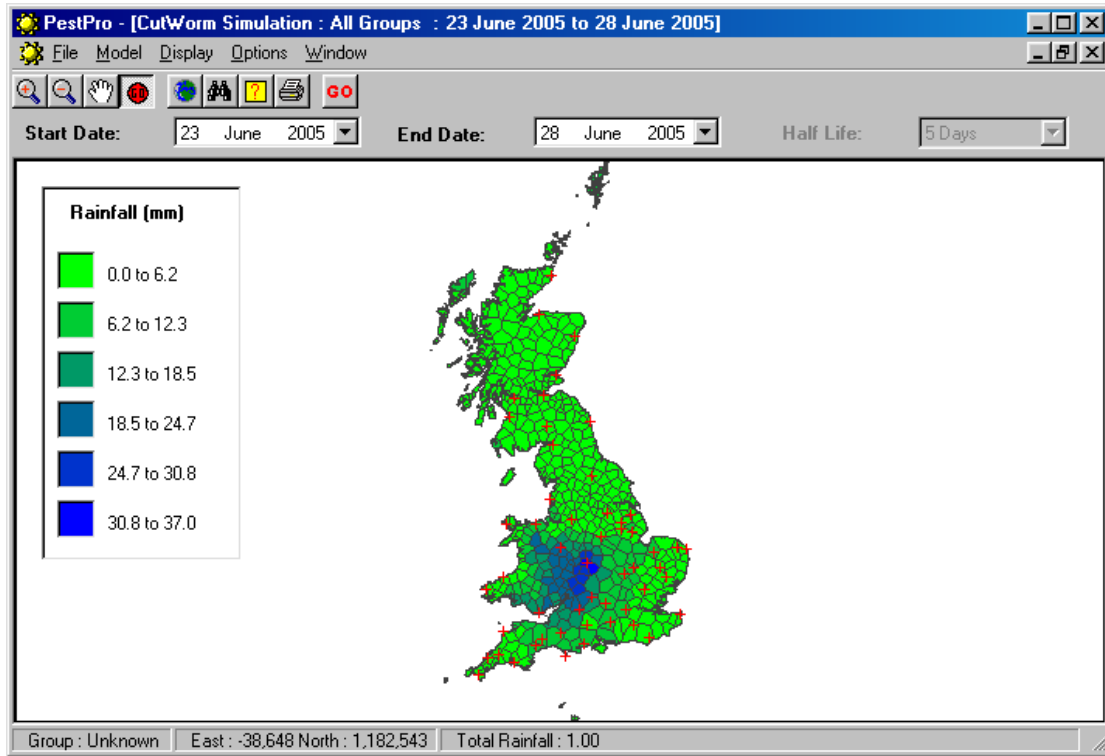
The most susceptible crops (lettuce, leeks, red beet) grown in the areas of Norfolk, Suffolk, Lincolnshire, Essex, Cambs, Herts, Kent and Sussex are now at risk of cutworm damage if they did not get at least 10mm of rain on Friday or Saturday, unless they are irrigated (at least 20mm irrigation) or they have been sprayed with an insecticide that kills caterpillars in the last 10 days. Unirrigated, unsprayed, very susceptible crops in these counties should be treated against cutworms in the next three days.

In the rest of Southern England treatment is not yet necessary, due either to the rain that fell or because development of cutworms has been slower in cooler conditions.

Cooler conditions in Northern England and Scotland have also delayed development in these areas and treatment is not yet required.

The situation will be reviewed again on Thursday, 30th June.

Map 1 Rainfall, 23rd June – 28th June 2005



Horticultural Development Council
Cutworm Monitoring & Prediction, 2005.

Prepared by Mike Lole
ADAS Wolverhampton

Report No 6, 30th June 2005

Current Situation

Slightly cooler temperatures have slowed the development of cutworm larvae slightly, but in most areas of Britain the first larvae of the third instar (the invulnerable underground-feeding stage) have just begun to appear, or are about to, or would be about to if the recent rainfall had not caused mortality of the developing caterpillars.

Rainfall at the critical time between egg-hatch and the third instar, underground-feeding stage can significantly affect the survival of young cutworms. Britain now divides into three distinct risk areas based on recent rainfall events (see Map 1):-

- i) Area 1: Those parts of south-east England that did not get substantial rainfall on either the 24th or the 29th June, including Kent, Sussex and parts of Hampshire.
- ii) Area 2: Wales, and England south of a line approximately Preston-Leeds-Hull, excluding the area of south-east England described above
- iii) Area 3: England north of the Preston-Leeds-Hull line and the whole of Scotland

Area 1 has had no substantial rainfall during June and increasing numbers of cutworms are reaching the third instar stage (see Map 2).

Area 2 had significant rainfall on 24th and/or 29th of June which will have caused significant mortality of developing caterpillars, reducing the risk of damage at present.

Area 3 has had some rainfall, but not enough to cause 100% mortality of developing cutworms. However, temperatures have been cooler in this area and cutworm development is less forward than it is in the south-east.

Some rainfall is forecast for the weekend.

Action

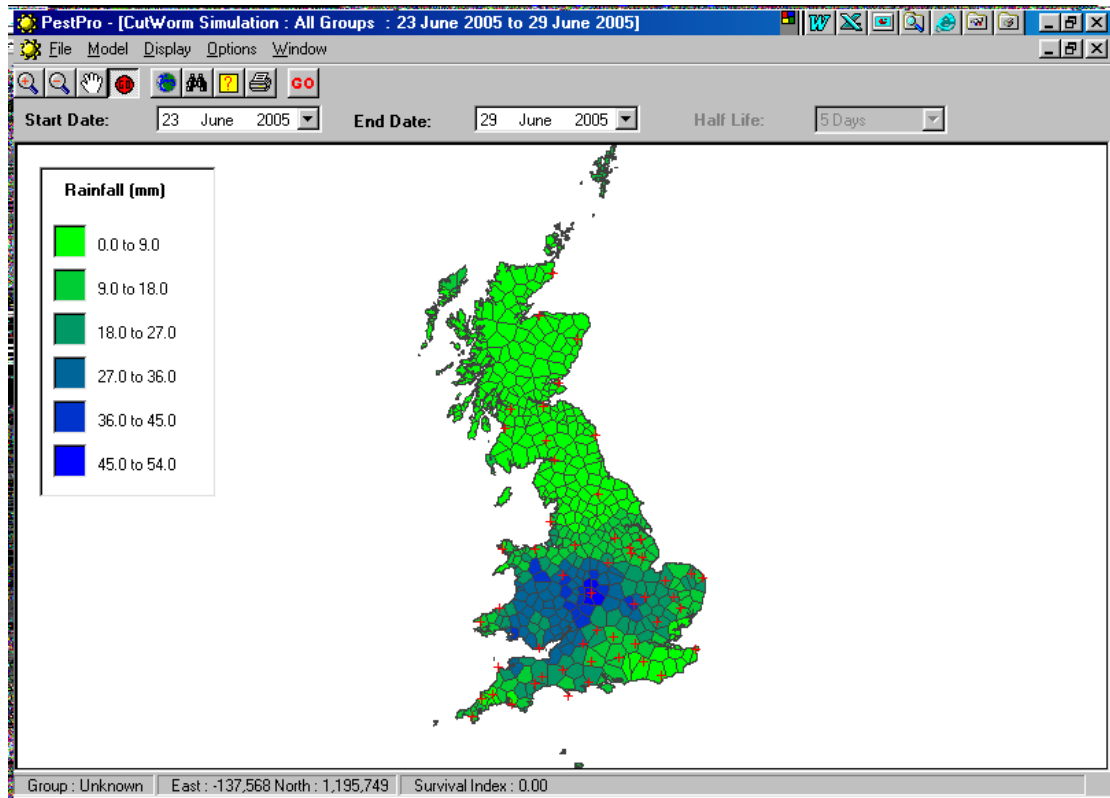
The most susceptible crops (lettuce, leeks, red beet) grown in the dry Area 1 (Kent, Sussex and parts of Hampshire) are now at risk of cutworm damage unless they are irrigated (at least 20mm irrigation) or they have been sprayed with an insecticide that kills caterpillars in the last 10 days. Unirrigated, unsprayed, very susceptible crops in these counties should be treated against cutworms in the next three days. If there is no substantial rainfall by the time of the next report then it may become necessary to treat moderately-susceptible crops (brassicas, carrot, celery, parsnip, sugar beet). We will assess this and the risk to the least susceptible crops (potato, onion, swede, turnip) in the next report

In Area 2 rainfall-induced mortality of developing caterpillars has removed the need for any treatments against cutworms for at least a week. No treatment is therefore recommended in these areas at present. This will be reviewed in the next report

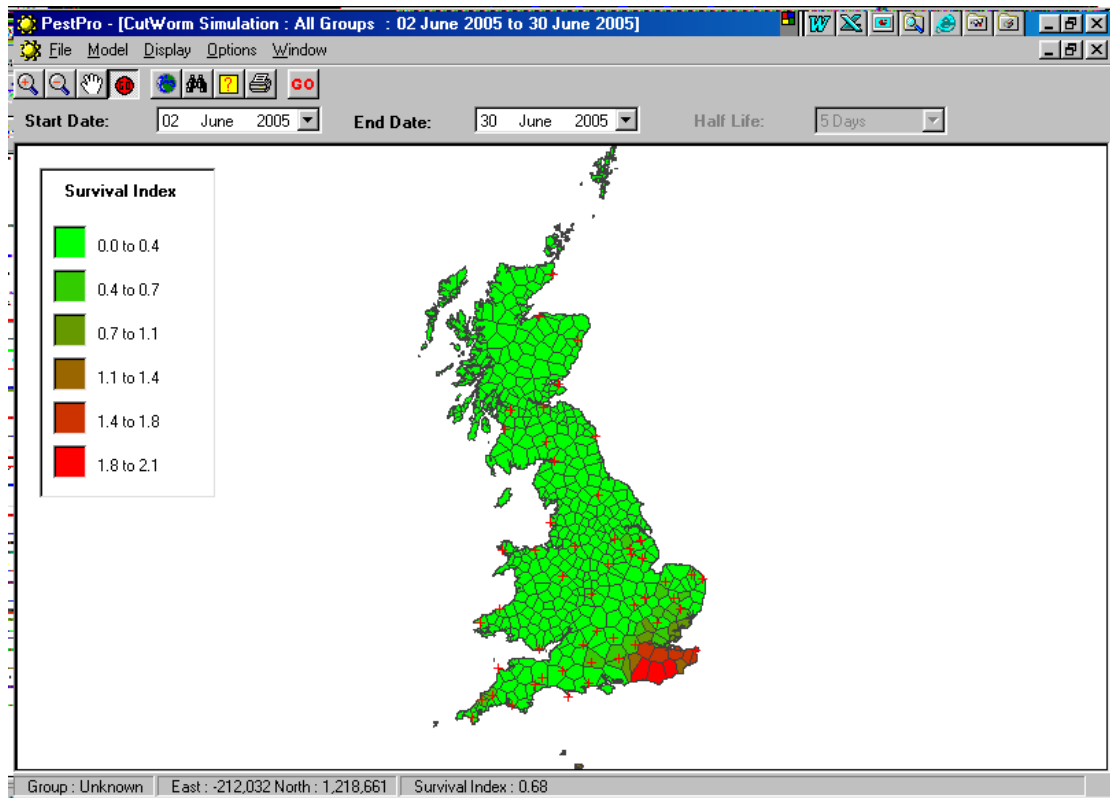
In Area 3 development has been slower and there has been some rainfall-induced mortality. Treatment is not therefore immediately necessary but the most vulnerable crops in this area may be at risk by the time of the next report. We will assess this at that time.

The situation will be reviewed again on Thursday, 7th July.

Map 1 Rainfall, 23rd June – 29th June 2005



Map 2 Cutworm survival index, 30th June 2005



Horticultural Development Council
Cutworm Monitoring & Prediction, 2005.

Prepared by Mike Lole
ADAS Wolverhampton

Report No 7, 7th July 2005

Current Situation

Rainfall has dominated the weather scene for the past 12 days, with significant rain events in all areas since 24th June, particularly during June 28th – 30th and July 4th – 6th (see Map 1). Accompanying temperatures have also been a lot lower than they were in mid June. The cooler temperatures have slowed the development of cutworms, but more importantly the rainfall will have caused major mortality of the 1st and 2nd instar caterpillars that are foliar feeders.

The rain was very timely and few cutworms will have escaped one or other of the storms, the exceptions being in Kent and Sussex where the rain did not fall until 3 or 4 days-worth of egg batches had reached the third instar stage (see Map 2).

The widespread nature of the rain now means that the rainfall areas described last week are irrelevant and can now be ignored.

Action

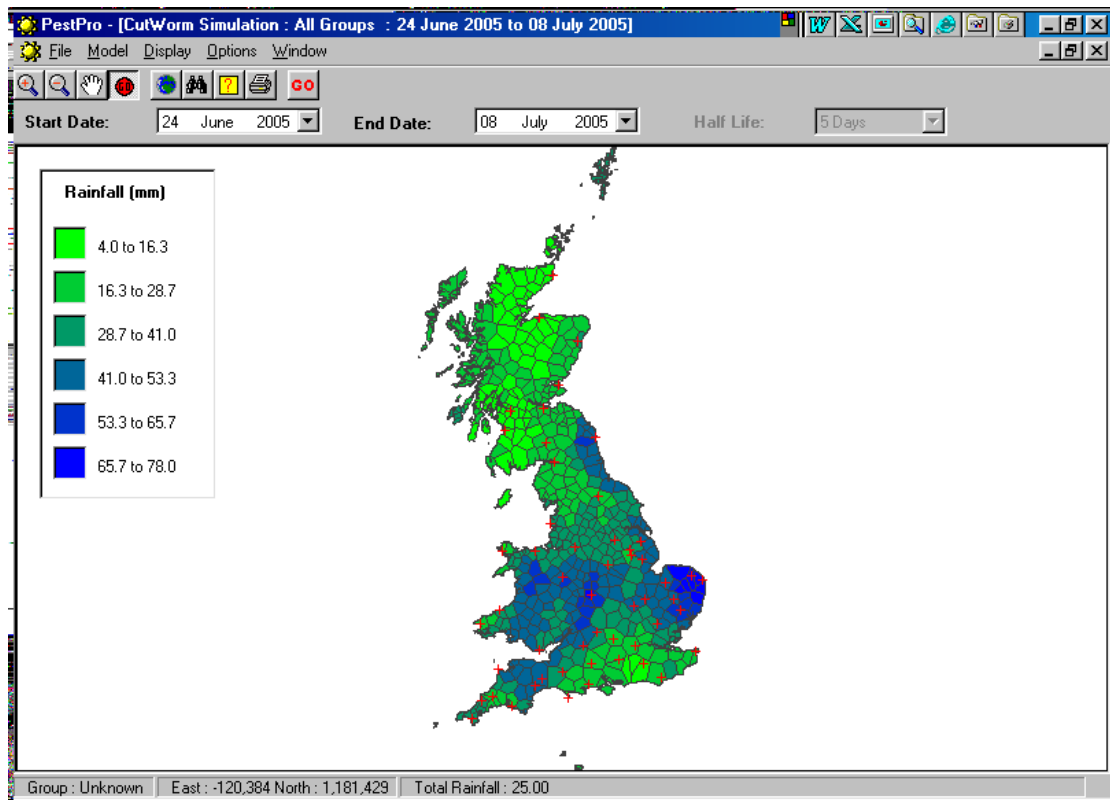
By now, the most susceptible crops (lettuce, leeks, red beet) grown in Kent, Sussex and parts of Hampshire, which was the high-risk area last week, should have been sprayed against cutworms or will have had substantial rainfall, obviating the need for treatment.

It should not have been necessary to treat any other crops before the rainfall arrived.

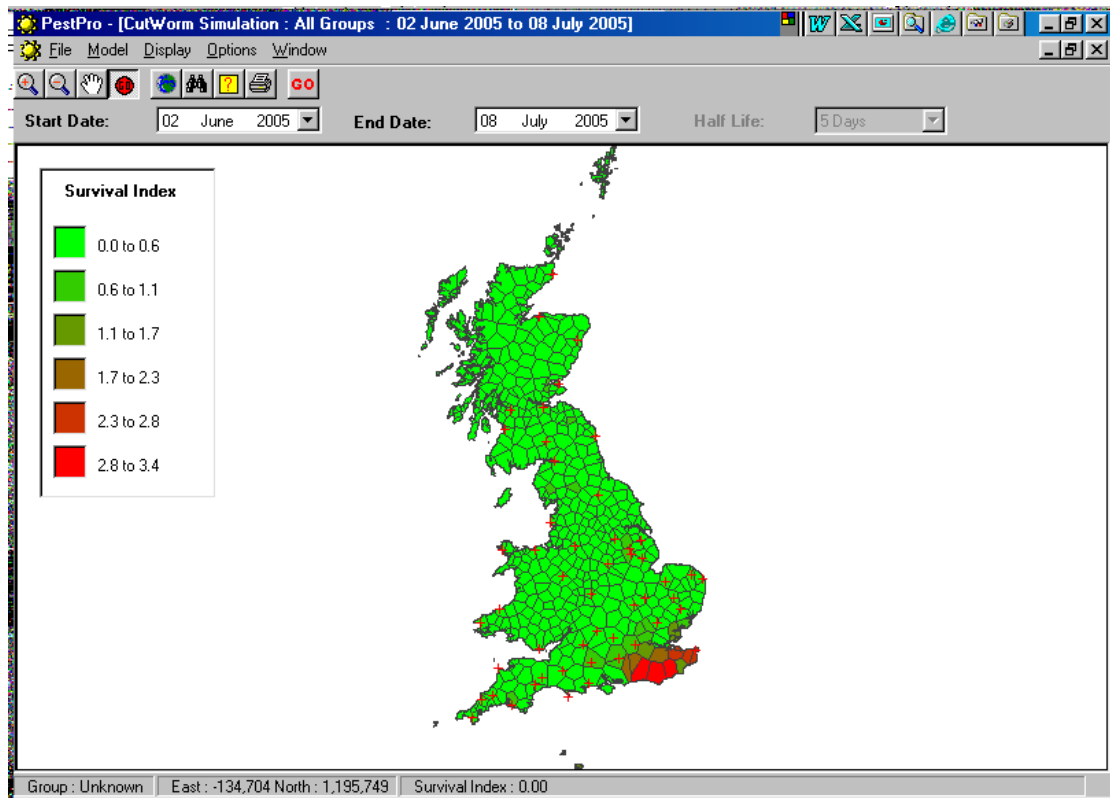
There is no need to consider treating any crops against cutworms for at least 7 days, ie. by the time of the next report.

The situation will be reviewed again on Thursday, 14th July.

Map 1 Rainfall, 24th June – 8th July 2005



Map 2 Cutworm survival index, 8th July 2005



Horticultural Development Council
Cutworm Monitoring & Prediction, 2005.

Prepared by Mike Lole
ADAS Wolverhampton

Report No 8, 14th July 2005

Current Situation

We have seen a return to warm, dry weather over most of Britain since the time of the last report (7th July). With the exceptions of parts of central northern England, East Anglia and the south-east (see map 1) there has been no significant rain since July 4th – 6th. Temperatures have also been high, with 30°C being recorded in places during this week.

At current temperatures, development of newly-hatched cutworms to the third instar stage, when they are invulnerable to rainfall and insecticides, is taking about 10 days. This means that the caterpillars which hatched just after the rain of 4/5th July are beginning to reach third instar now, and in areas where there has been no rain since 5th July the risk of cutworm damage is now beginning to accumulate.

The risk is most advanced in the areas where less than 10mm of rain fell on 4/5th July, particularly parts of Hampshire, Sussex and Berkshire (see map 2).

The current forecast is for cooler weather over the next few days but there is no widespread, significant rain expected.

Catches of adult moths have decreased in the last week and it can be assumed that egg-laying after this week will not be significant.

Action

There is no general need for cutworm sprays at present but the risk of damage is increasing, particularly in parts of southern and south-west England (see map 2). In these areas it may be necessary to spray the most susceptible crops (lettuce, leeks, red beet) early next week if there is no significant rainfall (10mm plus) in the meantime. Crops that are irrigated (20mm or more) or that have been treated with an insecticide that will kill caterpillars in the last week will not need treating.

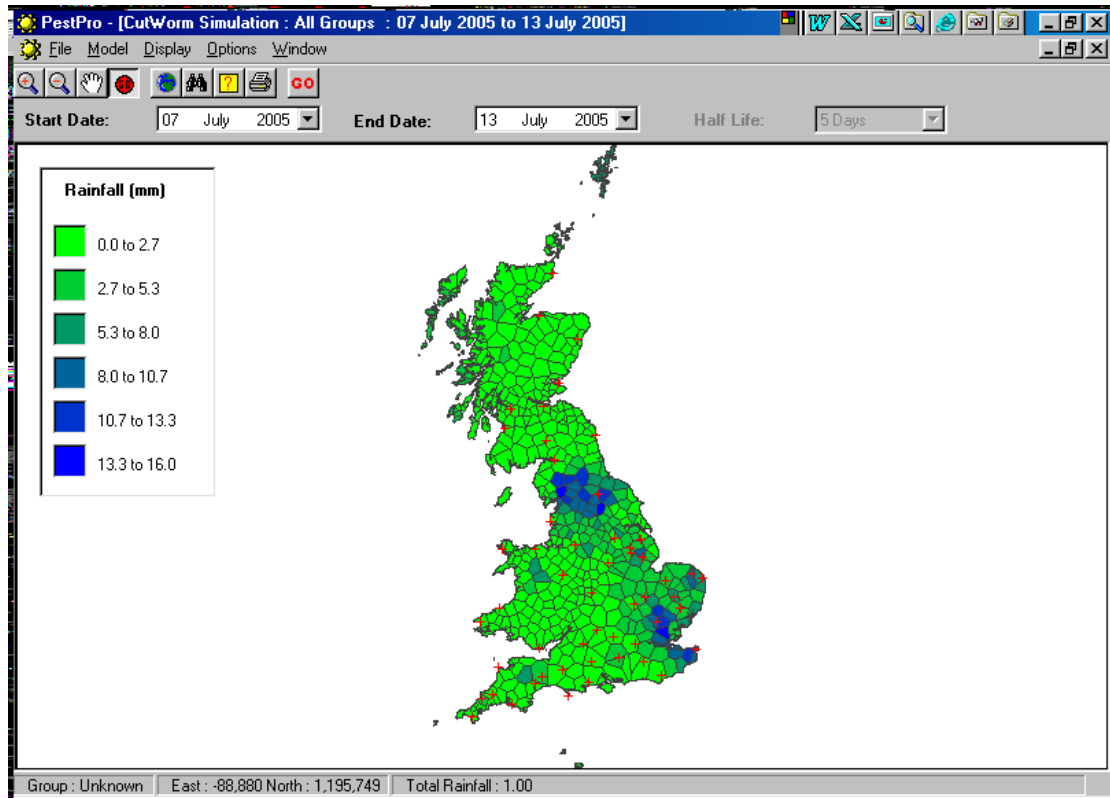
It will be necessary to consider the need for treatment of the less susceptible crops, including carrots, swedes, turnips and potatoes, at the time of the next report.

The situation will be reviewed again on Thursday, 21st July.

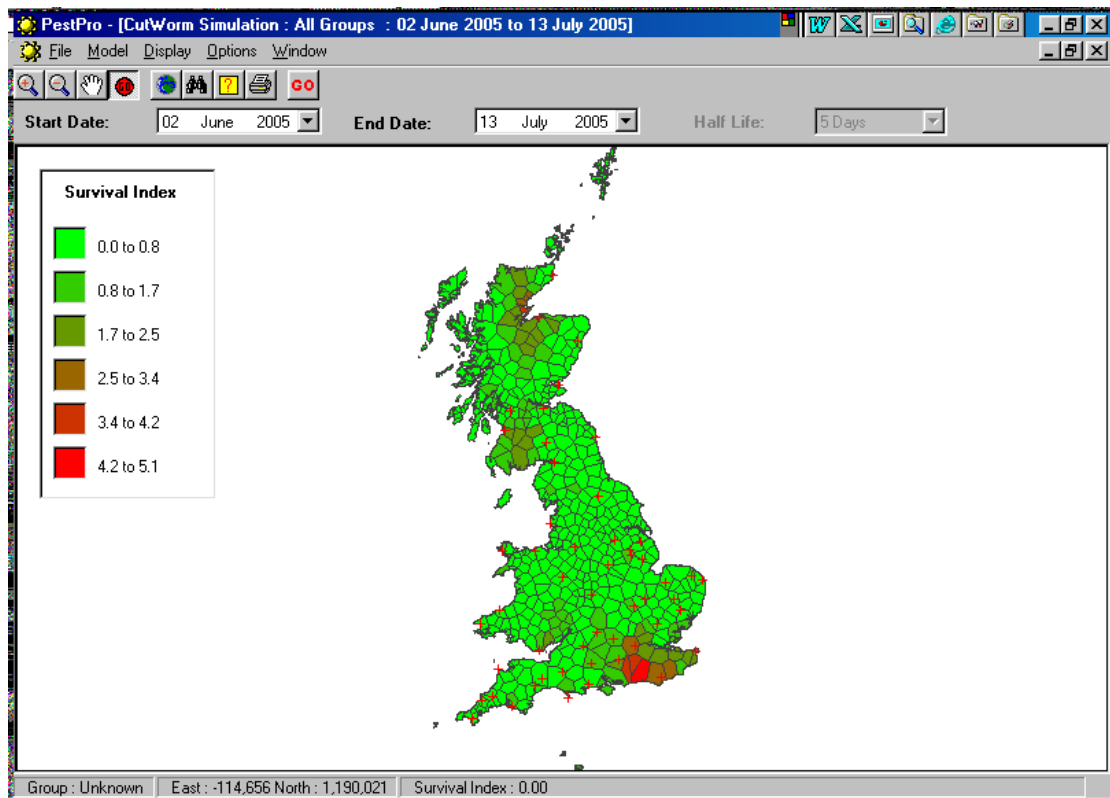
PLEASE NOTE:

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Map 1 Rainfall, 7th – 13th July 2005



Map 2 Cutworm survival index, 13th July 2005



Horticultural Development Council
Cutworm Monitoring & Prediction, 2005.

Prepared by Mike Lole
ADAS Wolverhampton

Report No 9, 21st July 2005

SPRAY WARNING IMMINENT

Current Situation

The weather has remained largely dry over much of England, Wales and eastern Scotland for the last two weeks, with no significant rain since July 4th – 6th in many areas (see map 1 for exceptions). Temperatures have also been high, though slightly less so in the last few days.

At current temperatures, development of newly-hatched cutworms to the third instar stage, when they are invulnerable to rainfall and insecticides, is taking from 10 to 17 days, with the warmest conditions in central England south of Yorkshire, particularly the home counties and around the Severn estuary. Caterpillars which hatched just after the rain of 4/5th July have been reaching the third instar in increasing numbers and the survival index is currently increasing quite rapidly.

The survival index is highest, and therefore the risk of cutworm damage greatest, in central southern England and in the Severn/Wye area (see map 2).

The current forecast is for temperatures to remain warm over the next few days. Some rain is predicted in Britain on Saturday/Sunday but the distribution and severity of this rainfall is in some doubt.

Action

The risk of damage is increasing, particularly in parts of in central southern England and in the Severn/Wye area (see map 2). In these areas there is a case for spraying the most susceptible crops (lettuce, leeks, red beet) immediately, if they have not already been treated. The need for treatment of the less susceptible crops in these areas, including carrots, swedes, turnips and potatoes, will depend on what rainfall events occur over the coming weekend (23/24 July). If there is 10mm of rain or more then this will obviate the need for treatment. Otherwise, the risk of damage to carrot, swede and turnip will justify treatment against cutworms on Monday or Tuesday. Potatoes are slightly less susceptible but again, if there is no rain in the areas of southern England and Wales that are at the highest risk level (map 2) then potato crops in these areas should be treated against cutworms by Wednesday or Thursday.

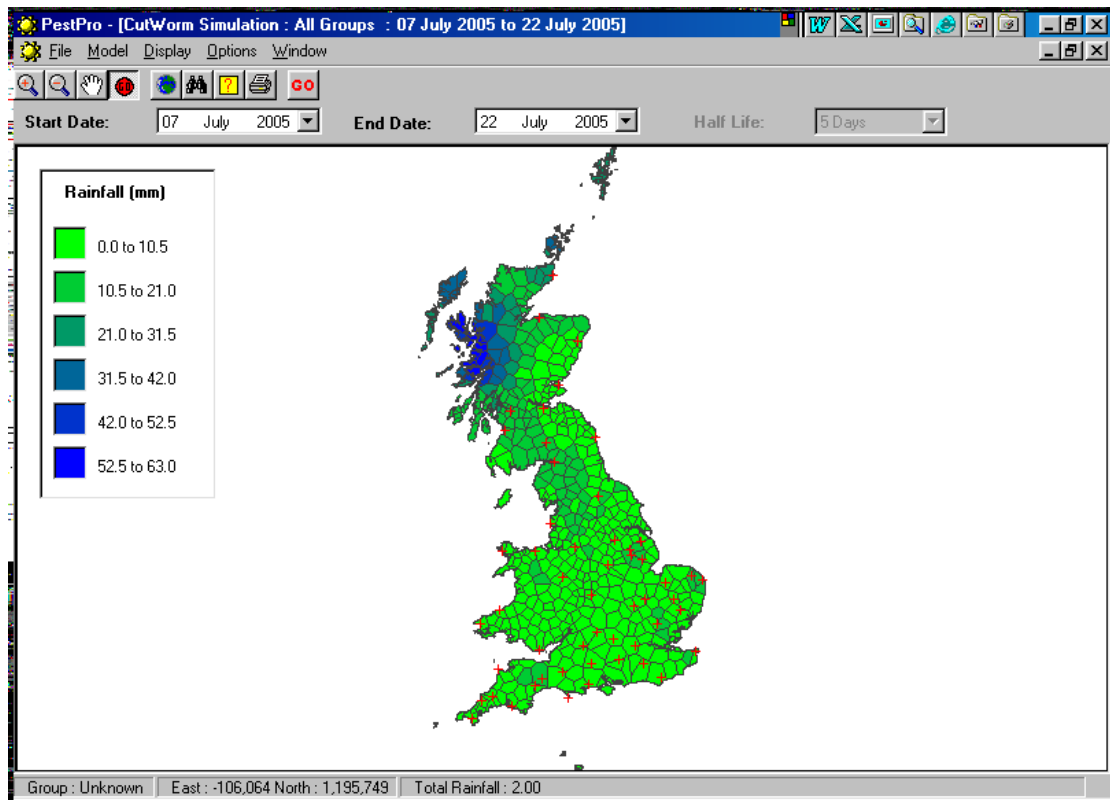
Crops that are irrigated (20mm or more) or that have been treated with an insecticide that will kill caterpillars in the last two weeks will not need treating.

The situation will be reviewed again on Thursday, 28th July.

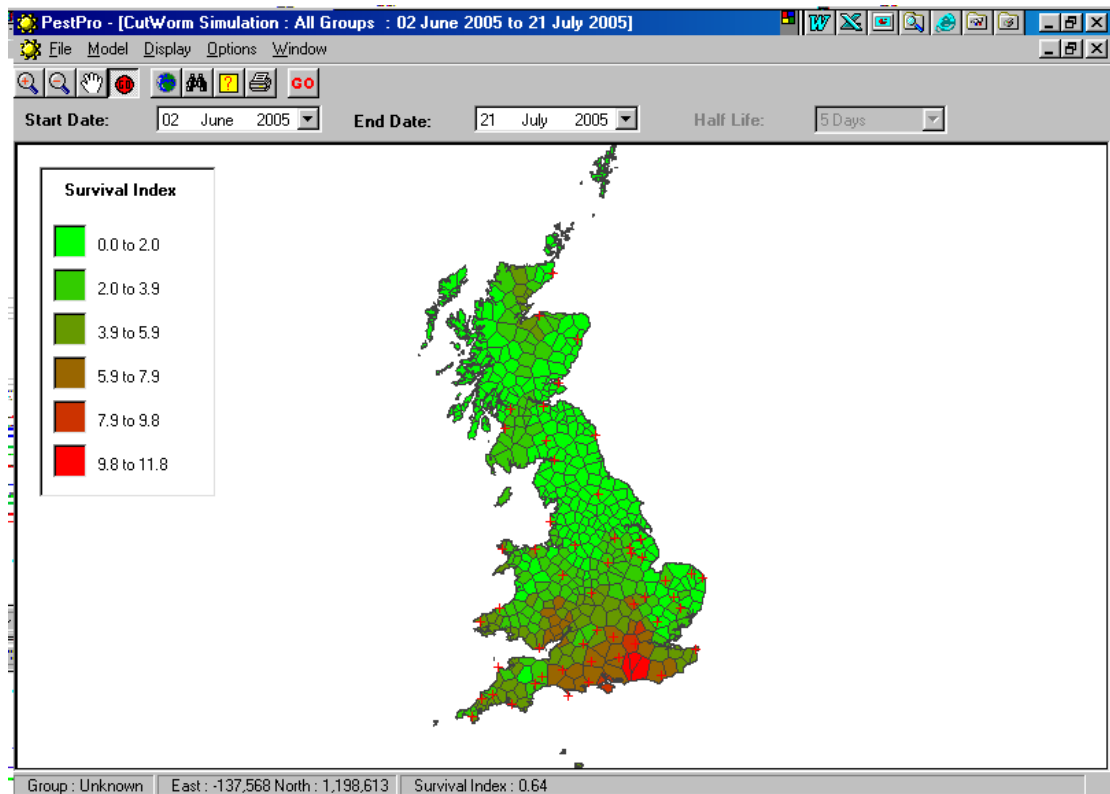
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Map 1 Rainfall, 7th – 22nd July 2005



Map 2 Cutworm survival index, 21st July 2005



Horticultural Development Council
Cutworm Monitoring & Prediction, 2005.

Prepared by Mike Lole
ADAS Wolverhampton

Report No 10, 28th July 2005

Current Situation

The advent of heavy rain over the southern half of Britain during 23rd to 27th July (map 1) will have had a major effect on cutworms in this area, causing high mortality to 1st and 2nd instar caterpillars. Northern Britain missed out on this rain, but the rain that fell in the south on the 27th and 28th July is now moving north as this report is being written and it seems that this rain will preclude the need for any cutworm treatment in the north. Temperatures have plummeted with the advent of the rain and this will have slowed the development of eggs and young larvae.

The current forecast is for showery rain to continue over the next few days.

Action

The heavy rain in Wales and in England south of a line from the Mersey to the Humber will have caused high mortality to developing cutworms in this area and has removed the need for any treatments to control cutworms. Further rain has fallen on the 27th in this area. Only larvae hatching after the 28th are likely to have escaped the rain, and the eggs that will have produced these larvae would have been laid on about the 17th of July. By this time, egg-laying will have been minimal, so the risk of further damage will be very small.

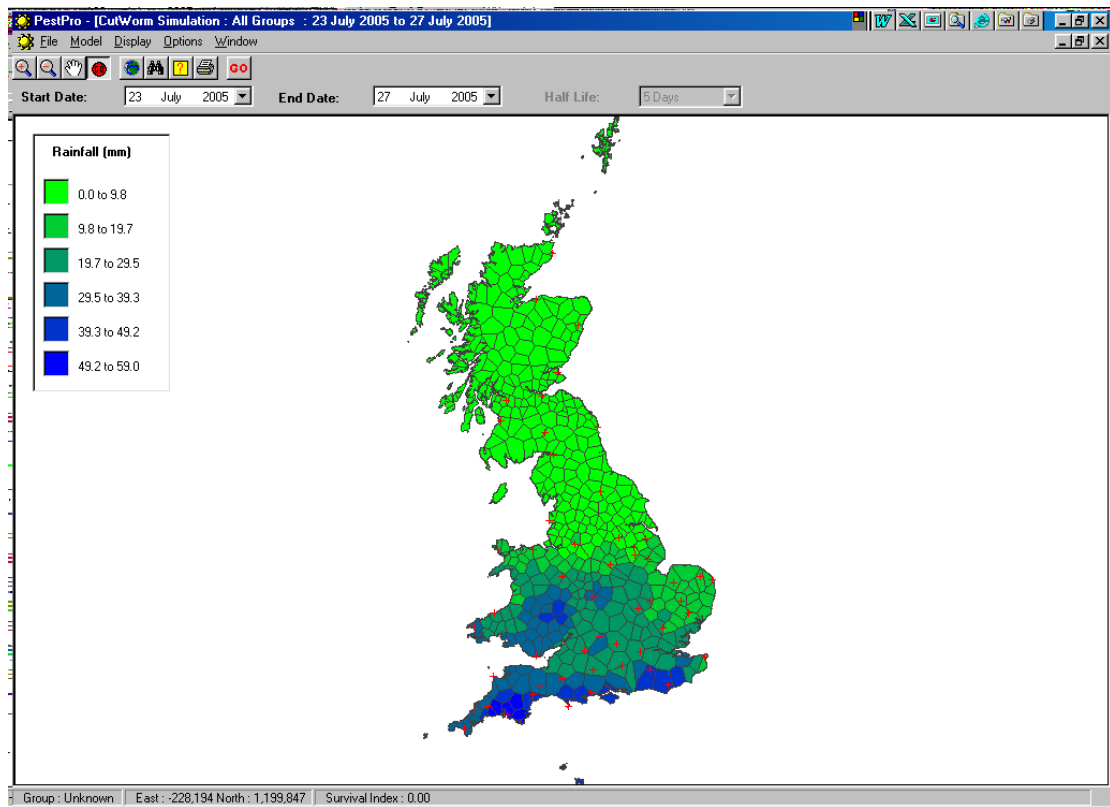
Britain north of the Mersey-Humber line missed out on the rain of 23/24/25th July and as a consequence the cutworm index in these areas has been rising steadily (map 2), though in general it has not yet reached the levels that might trigger a pesticide treatment. However, it seems that the heavy rain of the 27th/28th is moving north into these areas, which will render pesticide treatments unnecessary. On this assumption, no spray warning will be issued this week for this area.

The situation will be reviewed again on Thursday, 4th August, when the record of the rainfall of 28th July and subsequent days will be available and will be taken into account. It is likely that this will be the final report for 2005.

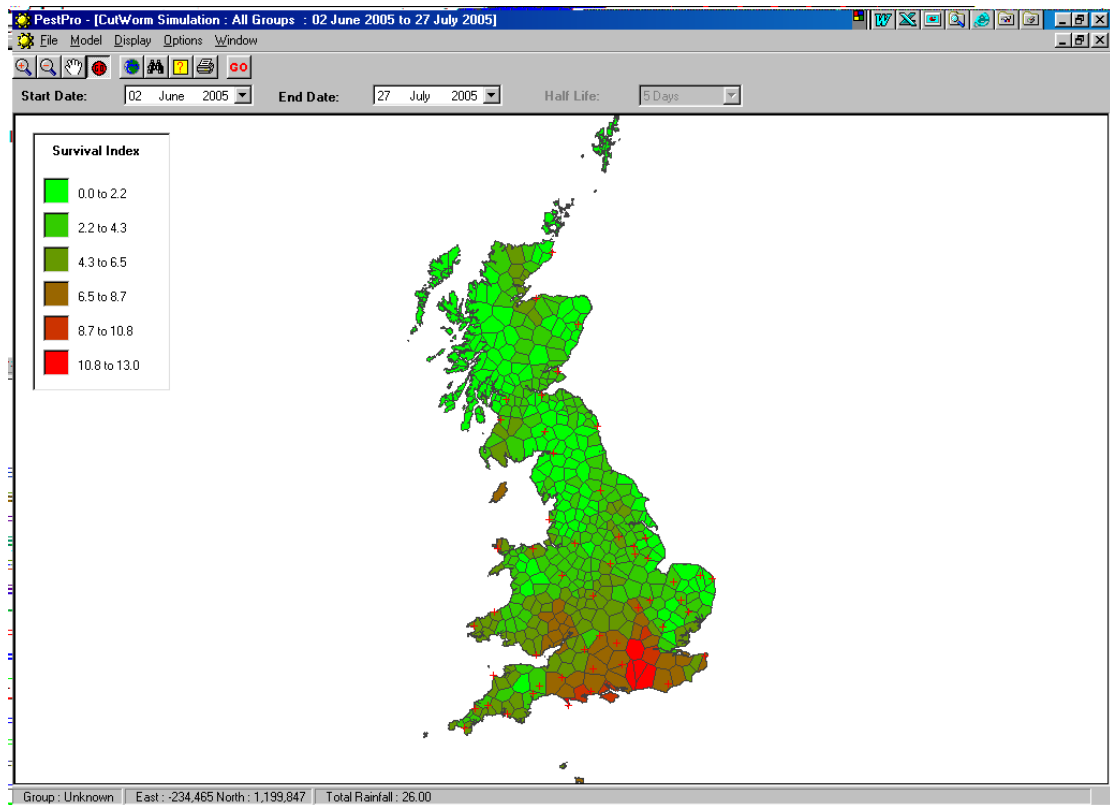
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Map 1 Rainfall, 23rd – 27th July 2005



Map 2 Cutworm survival index, 27th July 2005



Horticultural Development Council
Cutworm Monitoring & Prediction, 2005.

Prepared by Mike Lole
ADAS Wolverhampton

Report No 11, 4th August – Final Report, 2005

Current Situation

At least 15mm of rain has fallen over the whole of England and Wales in the period from July 22nd to August 3rd, with most areas having a good deal more than this (eg 60mm+ in parts of Sussex, south Devon and Pembrokeshire) (Map 1). This has effectively put an end to any further risk of cutworm damage in England and Wales in 2005.

Scotland had rather less rain in the above period, but lower temperatures (which slow cutworm development) and previous rain events, taken together, mean that there is also a negligible further risk of cutworm damage in Scotland in 2005.

Action

No further action on cutworms is likely to be necessary in Great Britain in 2005.

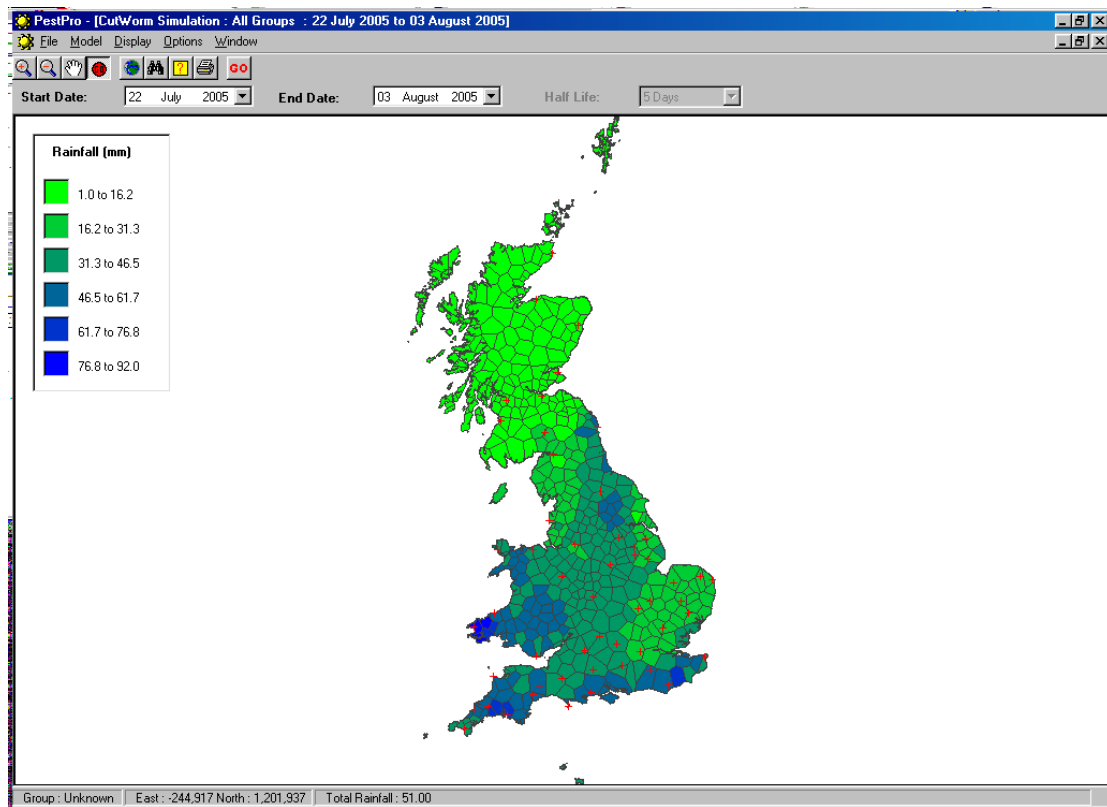
Summary

Overall, 2005 has not proved to be a high-risk year as far as cutworm damage is concerned. The areas of highest risk were central southern and south-eastern England (see map 2), particularly Hampshire and Sussex. Treatment of the most susceptible crops was recommended in these areas on about the 21st of July, but even in the highest-risk parts the cutworm survival index did not rise high enough to justify treatment of potatoes.

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Map 1 Rainfall, 22nd July – 3rd August 2005



Map 2 Cutworm survival index, to 3rd August 2005

